REMARKS/ARGUMENTS

Claims 12 and 14 have been amended. Claim 2 has been canceled without prejudice or disclaimer. New claims 21-28 have been added as supported by the Application as originally filed, for example in original Claims 1-19. Claims 1 and 3-28 remain in this application.

Claim 12 has been amended to correct a typographical error wherein a phrase within the claim was inadvertently repeated. Claim 12 has not been amended as a response to any rejection.

Claim 14 has been amended to clarify that $\Delta_{1,MAX}$ is disposed in the central core region, as supported in the Application as filed, for example at page 9 paragraph [0053]. Claim 14 has not been amended as a response to any rejection.

Applicants note that the subject matter of the various claims in the present Application was commonly owned at the time of any inventions covered therein were made.

1. Claim Rejections under 35 USC § 103

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukasa US Pat. 6,724,966.

The Patent Office asserts that Mukasa discloses a number of embodiments of an optical waveguide fiber, wherein the embodiments of Mukasa comprise a central core region surrounded by an outer cladding region and further comprise one or more of: a central core region having an alpha less than 4, the fiber having a dispersion at a wavelength of about 1550 nm of between about 5 ps/nm/km and about 8 ps/nm/km, and a dispersion slope of less than 0.025 ps/nm^2/km at every wavelength between about 1525 nm and 1650 nm [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

The Patent Office states that Mukasa does not explicitly disclose the above limitations exactly in a single embodiment, but that Mukasa teaches the above limitations as results effective variables [referencing MPEP 2144.07] suitable for the intended purpose of comprising a fiber with controlled waveform distortion due to non-linearity and a waveform distortion due to dispersion [referencing the Abstract] for good optical transmission line performance.

The Patent Office further states that Mukasa is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add/combine the above limitations as a results effective variable(s) to achieve controlled waveform distortion due to non-linearity and a waveform distortion due to dispersion for good optical transmission line performance.

The Patent Office concludes that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of

Mukasa with the above limitations to achieve controlled waveform distortion due to non-linearity and a waveform distortion due to dispersion for good optical transmission line performance.

Regarding Claim 3, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 1 wherein the dispersion slope is less than 0.025 ps/nm^2/km at every wavelength between about 1525 nm and 1700 nm [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 4, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 1 wherein the absolute magnitude of the dispersion is less than 10 ps/nm/km at every wavelength between about 1310 nm and 1700 nm [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 5, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 1 further comprising a first annular core region surrounding and immediately adjacent the central core region, the first annular core region having a minimum relative refractive index percent, Δ_{2MIN} between -0.3% and -0.4% [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 6, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 1 wherein the fiber has zero dispersion wavelength less than about 1400 nm [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 7, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 1 wherein the fiber has a cabled cutoff wavelength of less than about 1260 nm [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 8, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 1 wherein the fiber has an effective area of greater than about 40 μm^2 at a wavelength of about 1550 nm [referencing the entire patent, especially tables at col. 13, lines 24-34- col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 9, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 1 wherein the fiber has a pin array bending loss less than about 8 dB at a wavelength of about 1550 nm [referencing the entire patent, especially tables at co. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 10, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 1 wherein the fiber has a pin array bending

loss less than about 5 dB at a wavelength of about 1550 nm [entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 11, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 1 wherein the fiber has a pin array bending loss less than about 15 dB at a wavelength of about 1600 nm [entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 12, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 1 wherein the optical fiber further comprises: a first annular core region immediately adjacent and surrounding the central core region and having a negative relative refractive index percent, $\Delta_{2\%(r)}$, with a minimum relative refractive index percent, Δ_{2MIN}; a second annular core region immediately adjacent and surrounding the first annular core region and having a positive relative refractive index percent, $\Delta_{3\%(r)}$ with a maximum relative refractive index percent, Δ_{3MAX}; and a third annular core region immediately adjacent and surrounding the second annular core region and disposed between the second annular core region and the outer annular cladding region, the third annular core region having a negative relative refractive index percent, $\Delta_{4\%(r)}$ with a minimum relative refractive index percent, Δ_{4MIN} negative relative refractive index percent, Δ_{4MIN}; wherein the central core region extends radially outward from the centerline and has a positive relative refractive index percent, $\Delta_{1\%(r)}$ with a maximum relative refractive index percent, Δ_{1MAX}; and wherein the outer annular cladding region surrounds and is immediately adjacent the third annular core region and has a relative refractive index percent, $\Delta_{c\%(r)}$ [referencing the entire patent, especially tables at col. 13, lines 24-34, col 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 13, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber to Claim 12 wherein the central core region has an alpha less than 3.5 [referencing the entire patent, especially tables at col. 13, lines 24-34, co. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 14, the Patent Office states Mukasa, as combined above, teaches waveguide fiber of Claim 12 wherein Δ_{1MAX} is between about 0.5% and 0.7% [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 15, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 12 wherein the central region has a radius of between about 3 μm and about 5 μm [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 16, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 12 wherein Δ_{2MIN} is between -0.2% and -0.5% [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 17, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 12 wherein the first annular core region has a width of between about 1 μm and 51 m and a midpoint between about 3 μm and 7 μm, wherein the second annular core region has a width of between about 3 μm and 7 μm and a midpoint between about 7 μm and 11 μm, and wherein the third annular core region has a width of between about 2 μm and 6 μm and a midpoint between about 11 μm and 15 μm [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 18, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 12 wherein Δ_{3MAX} is between 0.1% and 0.3% [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-56, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 19, the Patent Office states Mukasa, as combined above, teaches the optical waveguide fiber of Claim 12 wherein Δ_{4MIN} is between about -0.03% and -0.2% [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-56, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

Regarding Claim 20, Mukasa, as combined above, teaches an optical transmission line comprising the optical waveguide fiber of Claim 1 which is considered to render the claimed optical transmission system obvious, since optical transmission line fibers [referencing the title] are specifically designed for use in optical transmission systems [referencing the entire patent, especially tables at col. 13, lines 24-34, col. 14, lines 46-55, col. 16, lines 19-30, col. 17, lines 1-14, col. 20, lines 27-50].

The rejections are traversed.

Applicants submit that Mukasa does not disclose all of the elements of instant Claim 1 in any single embodiment of Mukasa, and otherwise provides no teaching or suggestion of how to achieve an optical fiber as claimed in Claim 1, nor any suggestion or motivation for the desirability of such optical fiber and therefore does not constitute an enabling reference for purposes of a rejection. References relied upon to support a rejection under 35 USC 103 must provide an enabling disclosure, i.e., they must place the claimed invention in the possession of the public. In re Payne, Durden, and Weiden, 203 USPQ 245, 255 (CCPA 1979), citing In re Brown, 51 CCPA 1254, 1259, 329 F.2d 1006, 1011, 141 USPQ 245, 249. An invention is not "possessed" absent some known or obvious way to make it. *Id.*, citing In re Hoeksema, 55 CCPA 1493, 1500, 399 F.2d 209, 274, 158 USPQ 596, 601 (1968). While one or more elements of the present claims might be found in one embodiment disclosed in Mukasa, Mukasa does not teach or suggest an optical fiber having all of the claimed elements of Claim 1, nor does Mukasa teach or suggest how to make such an optical fiber.

Accordingly, Applicants submit that Mukasa is not an enabling reference.

Mukasa teaches seven different refractive index profiles in its Figures 2(a) – 2(e) and Figures 3(a) and 3(b).

Table 1 of Mukasa contains Examples 1 and 2 having the profile of Fig. 2(a). The Fig. 2(a) profile does not have a central core region having an alpha less than 4. The profile in Fig. 2(a) has a central core region with a negative Δ_1 and an alpha of infinity, which is not less than 4. Furthermore, Examples 1 and 2 in Table 1 of Mukasa have a dispersion slope of 0.067 and 0.069, neither of which is less than 0.025 ps/nm^2/km, and therefore would not have a dispersion slope less than 0.025 at every wavelength between about 1525 nm and 1650 nm.

In Table 2, Mukasa discloses prototypes 1 and 2 which have refractive index profiles "which are close to Examples 1 and 2 in Table 1", prototypes 3 and 4 having profiles of Fig 2(b), and prototypes 5 and 6 having a profile of Fig. 2(c). Similarly to the profile of Fig. 2(a), the profiles in Fig. 2(b) and 2 (c) have a central core region with the negative Δ_1 and an alpha of infinity, which is not less than 4. Also, none of the prototypes reported in Table 2 of Mukasa have a dispersion slope at 1550 nm of less than 0.025 ps/nm^2/km, and therefore would not have a dispersion slope less than 0.025 at every wavelength between about 1525 nm and 1650 nm. Furthermore, the dispersion slope values reported for prototypes 1 and 2 of Table 2 are significantly different than the slope values reported for Examples 1 and 2 of Table 1, yet Mukasa provides no teaching of how to achieve this difference in slope, wherein Mukasa at col. 14 lines 37-40 states that Trial Examples 1 and 2 ("prototypes"?) are close to Examples 1 and 2 in Table 1. Additionally, the profiles in Fig. 2(b) and 2(c), corresponding to prototypes 3 – 6, each having a Δ_3 and radial and width dimensions the values for which are absent from Mukasa, thereby providing an incomplete teaching of the profile used to obtain prototypes 3 – 6.

Table 3 of Mukasa lists Examples 3 and 4 which have a refractive index profile shown in Fig. 3(a). Mukasa does not disclose whether or not the profile in Fig. 3(a), or the profiles of Examples 3 and 4, have a central region with an alpha shape. However, assuming *arguendo* that the central region of the profile in Fig. 3(a) has an alpha, Mukasa does not teach what the alpha value should be. Even assuming *arguendo* that the alpha in Fig. 3(a) is less than 4, the dispersion values recorded for Examples 3 and 4 in Table 3 are -8.54 and -11.44 ps/nm/km, which is not between about 4 ps/nm/km and about 8 ps/nm/km as required by the instant Claim 1.

Table 4 of Mukasa lists prototypes 7 – 10. Prototypes 7 and 8 have a profile "which is close to that of Examples 3 and 4 in Table 3", as stated in col. 16 lines 58-60 of Mukasa. The dispersion values for prototypes 7 and 8 are listed as -7.1 and -12.1, which are not between about 4 and about 8 ps/nm/km, as required by the instant Claim 1. Furthermore, the dispersion slope reported for prototypes 7 and 8 (-0.015 and -0.020) are significantly different than the slope reported in Table 3 for Examples 3 and 4 (-0.047 and -0.066), even though Mukasa teaches that the profiles of prototypes 7 and 8 are close to that of Examples 3 and 4, with no teaching or indication of how to make optical fibers having such disparate slopes. Regarding prototypes 9 and 10, Mukasa does not teach or suggest values for the alpha of the central region, if any alpha. However, even assuming *arguendo* that the central region of the profile in Fig. 3(b) has an alpha less that 4, the dispersion reported for prototypes 9 and 10 (-8.1 and -10.8) are not between about 4 and about 8 ps/nm/km, as required by present Claim 1. Furthermore, there is no teaching or suggestion of what Δ_3 and radius or width of segment 4 in Fig. 3(b) ought to be.

Table 5 of Mukasa lists Examples 5 and 6 which have refractive index profiles shown in Fig. 2(d). In this case, Mukasa does teach a central core region having an alpha less than 4, yet the dispersion values reported for Example 5 and 6 (13.1 and 13.4) are not between about 4 and about 8 ps/nm/km, and the dispersion slope reported for Examples 5 and 6 (0.062 and 0.061) are not less than 0.025 ps/nm^2/km at 1550 nm, and therefore are not less than 0.025 at every wavelength between about 1525 nm and 1650 nm.

Similarly, Table 6 of Mukasa lists Examples 7 and 8 with dispersion (13.6 and 13.0) which is not between about 4 and about 8 ps/nm/km and dispersion slope (0.067 and 0.064) which is not less than 0.025 at every wavelength between about 1525 nm and 1650 nm. In Table 6, only Example 8 has an alpha less than 4.

Thus, even where Mukasa explicitly teaches a central core region having an alpha less than 4, its dispersion and dispersion slope values are significantly different from those claimed in the present claims. Moreover, Mukasa provides no teaching or suggestion of an optical fiber, nor how to make an optical fiber, having a central core region having an alpha less than 4, the fiber having a dispersion at a wavelength of about 1550 nm of between about 4 ps/nm/km and about 8 ps/nm/km, and a dispersion slope of less than 0.025 ps/nm^2/km at every wavelength between about 1525 nm and 1650 nm. Indeed, Mukasa does not even suggest that such an optical fiber is desirable, or even possible.

Applicants submit that Claim 1 is allowable for at least the above reasons, and dependent Claims 2-20 are therefore allowable for the same reasons. Additional reasons are set forth below.

Regarding Claims 1 and 3, Applicants submit that Mukasa does not teach or suggest what its dispersion slope is at wavelengths other than 1550 (for example, at 1650 nm) in any of its examples from Tables 1 – 6. Likewise, Mukasa does not teach or suggest what its absolute magnitude of dispersion at every wavelength between about 1310 nm in any of its embodiments.

Regarding Claim 6, Mukasa does not teach or suggest what the zero dispersion wavelength is for any of its embodiments.

Regarding Claim 8, Examples 3 and 4 in Table 3 of Mukasa with reported effective areas of 32.1 and 23.3 μm^2 are particularly inapplicable to the claimed effective area greater than about 40 μm^2 at a wavelength of about 1550 nm.

Regarding Claims 9, 10 and 11, Mukasa does not teach or suggest what the pin array bending loss would be for any of the fibers disclosed therein. Mukasa does not even mention pin array bending loss.

Regarding Claims 12, 17 and 19, Mukasa does not teach or even suggest an optical fiber having a third annular core region.

Regarding Claim 14, Mukasa does not teach or even suggest a central core region having a $\Delta_{1,MAX}$ between about 0.5% and 0.7%. In fact, Mukasa teaches the following values for Δ_1%:

Table 1, Example 1	-0.5
Table 1, Example 2	-0.4
Table 3, Example 3	0.85
Table 3, Example 4	1.15
Table 5, Example 5	0.40
Table 5, Example 6	0.45
Table 6, Example 7	0.40
Table 6, Example 8	0.45

Regarding Claim 18, Mukasa does not teach or suggest any values for Δ_3 (corresponding to a second annular region that surrounds a first annular region and a central core region).

In addition to Mukasa, the Patent Office also appears to be relying on MPEP 2144.07, entitled "Art Recognized Suitability for an Intended Purpose, which consists of two paragraphs which are reproduced in their entirety below:

> The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) (Claims to a printing ink comprising a solvent having the vapor pressure characteristics of butyl carbitol so that the ink would not dry at room temperature but would dry quickly upon heating were held invalid over a reference teaching a printing ink made with a different solvent that was nonvolatile at room temperature but highly volatile when heated in view of an article which taught the desired boiling point and vapor pressure characteristics of a solvent for printing inks and a catalog teaching the boiling point and vapor pressure characteristics of butyl carbitol. "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle." 325 U.S. at 335, 65 USPQ at 301.).
>
> See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious); Ryco, Inc. v. Ag-Bag Corp., 857 F.2d 1418, 8 USPQ2d 1323 (Fed. Cir. 1988) (Claimed agricultural bagging machine, which differed from a prior art machine only in that the brake means were hydraulically operated rather than mechanically operated, was held to be obvious over the prior art machine in view of references which disclosed hydraulic brakes for performing the same function, albeit in a different environment.).

Applicants respectfully submit that a citation of MPEP 2144.07 is improper at least for the reason that selection of a known material based on its suitability for its intended use, and in fact, selection of a known material *at all*, is not an issue that has

been raised with respect to the present claims as best as Applicants can tell. Applicants respectfully submit therefore that mention of MPEP 2144.07 is inapposite to the currently pending claims.

Accordingly Applicants request reconsideration and withdrawal of the rejection.

2. Conclusion

Based upon the above amendments, remarks, and papers of records, Applicants believe the pending claims of the above-captioned application are in allowable form and patentable over the prior art of record. Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Applicants believe that no extension of time is necessary to make this Reply timely. Should Applicants be in error, Applicants respectfully request that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Reply timely, and hereby authorize the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 03-3325.

Please direct any questions or comments to Joseph M. Homa at 607-974-9061.

Respectfully submitted,

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